

AA



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/365,356

07/30/1999

TONGBI JIANG

660073.774

1684

27076

7590

12/03/2003

DORSEY & WHITNEY LLP
INTELLECTUAL PROPERTY DEPARTMENT
SUITE 3400
1420 FIFTH AVENUE
SEATTLE, WA 98101

EXAMINER

BEREZNY, NEMA O

ART UNIT

PAPER NUMBER

2813

DATE MAILED: 12/03/2003

36

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/365,356

Applicant(s)

JIANG, TONGBI

Examiner

Nema O Berezny

Art Unit

2813

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 8-15, 18, 38, 40-45 and 50-53 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 8-15, 18, 38, 40-45 and 50-53 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 32. 6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after allowance or after an Office action under *Ex Parte Quayle*, 25 USPQ 74, 453 O.G. 213 (Comm'r Pat. 1935). Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 9-30-03 has been entered.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-3, 8-15, 18, 38, 40-45, and 50-53 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Independent claims 1, 11, 38, and 42 contain the phrase "... the strips further including a compliant carrier layer having a pair of opposing surfaces with a first adhesive layer disposed on a first surface of the opposing surfaces of the carrier layer to adhere the semiconductor die to the die attach surface of the interposer, and a second adhesive layer disposed on a second surface of the opposing surfaces of the carrier layer to adhere the carrier layer

to the die ..." (claim 1 lines 17-22). Delete "semiconductor die" on line 20 and insert -- carrier layer-- thereto.

An Examiner's Amendment was authorized by Steve Arterberry on Aug. 14, 2002 in which this change was made for claims 1, 11, 38, and 42; this change was also notated in Applicant's Amendment H, filed concurrently with an RCE on 12-11-02. However, this change was not carried forward with the following amendment, filed on 3-31-03 prior to a Notice of Allowance being issued.

Applicant is requested to make the noted change again so that the most current version of the pending claims will be correct.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 9-13, 15, 18, 38, and 40-45 are rejected under 35 U.S.C. 102(e) as being anticipated by Raab et al. (6,294,040). Raab discloses a semiconductor device package, comprising: a semiconductor die (Figs.1,14 el.20) having a first surface on which an integrated circuit and at least one electrically conductive bond pad (el.26) are fabricated, the die having first and second pairs of opposed lateral edges; at least one

Art Unit: 2813

electrically conductive external terminal (el.32); an interposer (el.22) having a die attach surface and an external surface opposite of the die attach surface disposed in between the semiconductor die and the at least one external terminal, the interposer having at least one electrically conductive interconnect (el.34) electrically coupling the at least one bond pad of the semiconductor die positioned adjacent to the die attach surface to the at least external terminal positioned adjacent to the external surface, the interposer being formed of an organic substrate or a polyimide substrate (col.8 lines 48-52); and a plurality of elongated strips of compliant adhesive film, each strip having a first length and a second lengths perpendicular to the first length, the first length being substantially greater than the second length, the strips extending substantially the entire distance between the first pair of opposed lateral edges and disposed between the semiconductor die and the interposer, a sum of the second lengths of the elongated strips being substantially less than a distance between the second pair of opposed lateral edges of the semiconductor die (Fig.14; col.14 lines 17-29), the strips further including a compliant carrier layer having a pair of opposing surfaces with a first adhesive layer disposed on a first surface of the opposing surfaces of the carrier layer to adhere the semiconductor die to the die attach surface of the interposer, and a second adhesive layer disposed on a second surface of the opposing surfaces of the carrier layer to adhere the carrier layer to the die (col.8 lines 59-67), the plurality of adhesive film strips being operable to reduce a thermal mismatch stress between the semiconductor die and the interposer (col.3 lines 43-51), wherein Applicant states in instant specification, p.9 that multiple pieces of elastomer film reduce the thermal

Art Unit: 2813

mismatch stress between adhered devices or structures. Raab also discloses an encapsulating material substantially filling regions remaining in between the semiconductor die and the interposer (col.10 lines 24-30); wherein the interposer comprises a flexible material (col.3 lines 30-41); wherein the plurality of strips of compliant adhesive film comprise strips of compliant adhesive film positioned in parallel along a longitude of the semiconductor die (Fig.14; col.14 lines 17-29); and wherein a first (Fig.14 el.836) and a second (el.856) of the plurality of strips of compliant adhesive film are positioned at a right angle with respect to each other.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raab as applied to claims 1-3 and 9-12 above, and further in view of Mitchell et al. (6,169,328). Raab does not disclose an external terminal comprising a solder ball. However, Mitchell discloses wherein the at least one electrically conductive external terminal comprises a solder ball (Fig.1 no #). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the solder ball of Mitchell with the semiconductor package of Raab in order to form a short and reliable electrical connection to an external structure, such as a printed circuit board.

Claims 50-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raab as applied to claims 1, 11, 38, and 42 above, and further in view of Takahashi et al. (5,461,087). Raab does not disclose multiple layers of a carrier layer. However, Takahashi discloses a double sided adhesive carrier layer, wherein said carrier layer comprises multiple layers (Figs.1a-1f). Therefore, it would have been obvious to a person skilled in the art at the time of the invention to use the multiple layered carrier layer of Takahashi with the method of fabricating a semiconductor device of Raab in order to increase the cohesion and adhesion at elevated temperatures, as well as provide superior thermal resistance (Takahashi – col.3 lines 58-63).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nema O Berezny whose telephone number is (703) 305-3445. The examiner can normally be reached on M-F 8:30-5:00.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on (703) 308-4940. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Art Unit: 2813

Effective Feb. 5, 2004, Art Unit 2813 will move to the seventh floor of the Jefferson Building at the new USPTO facility in Alexandria, VA. This examiner can be reached at (571) 272-1686 after Feb. 5, 2004.

NB



JACK CHEN
PRIMARY EXAMINER